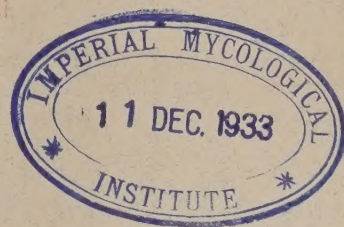


ADVISORY DEPARTMENT
OF THE IMPERIAL COLLEGE OF
TROPICAL AGRICULTURE.



R E P O R T

ON THE

AGRICULTURAL DEPARTMENT

DOMINICA.

1932.

ISSUED BY THE IMPERIAL COMMISSIONER OF AGRICULTURE.

1933.

[Price Sixpence.]

PRINTED AT THE BULLETIN OFFICE, ROSEAU, DOMINICA, B.W.I.

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CONTENTS.

	PAGE.
STAFF	x
LETTER OF TRANSMITTAL	xx
BOTANIC GARDENS	1
NURSERIES & PLANT DISTRIBUTION	1
LIME EXPERIMENT STATION... ..	3
LIME BREEDING WORK Report on Lime Oils.	4
LIME INDUSTRY	7 6.
MINOR INDUSTRIES	9
CHIEF EXPORTS	10
INSECT PESTS AND FUNGOID DISEASES	11
LEGISLATION AFFECTING CROPS	11
VISITS BY OFFICERS OF THE DEPARTMENT AND AGRICULTURAL INSTRUCTION Pupils—Northern District—Southern and Eastern Districts.	12
AGRICULTURAL EXHIBITION	13
DETAILS OF ADMINISTRATION Expenditure and Receipts—Exchange of Plants, Seed etc. Correspondence—Visits to the Department—Laboratory Work.	13 14.
GOVERNMENT MARKETING DEPOT AND PEASANTS' INFORMATION BUREAU	15
GOVERNMENT FRUIT FARM, COPT HALL	18
RETIREMENT OF MR. F. J. BAPTISTE	19
METEOROLOGICAL OBSERVATIONS	20

AGRICULTURAL DEPARTMENT, DOMINICA.

STAFF.

F. G. HARCOURT	Agricultural Superintendent and Curator, Botanic Gardens.
H. B. PIDDUCK (1)	Assistant Agricultural Officer, (Northern District.)
W. E. BASSETT *	Assistant Agricultural Officer.
A. C. WINSTON	Travelling Agricultural Instructor
G. R. COOLS-LARTIGUE (2)	Clerk.
F. J. BAPTISTE (3)	Foreman.
C. M. ALEXANDER (4)	Overseer.

GOVERNMENT FRUIT FARM.

R. A. KITCHING (5)	Assistant Agricultural Officer.
L. OSCAR *	Foreman.

PEASANTS' INFORMATION BUREAU AND GOVERNMENT
MARKETING DEPOT.

E. E. TAYLOR *	Officer-in-Charge and Chief Fruit Inspector.
G. A. WINSTON (6)	Clerk.
J. J. McDOWELL *	Foreman and Fruit Inspector.

- (1) Vacation leave from 10th. June to 9th. December.
- (2) „ „ „ 19th. April „, 9th. May.
- (3) Retired 31st. March, 1932.
- (4) Appointed Foreman 1st. April, 1932.
- (5) Seconded to British Honduras July, 1932.
- (6) Vacation leave from 6th. to 31st, December.

* Temporary appointments.

LETTER OF TRANSMITTAL.

C. A. 1196.

TRINIDAD,
18TH AUGUST, 1933.

Sir,

I have the honour to transmit the Report of the Agricultural Department, Dominica, for the year 1932.

2. The Botanical Gardens have made good progress during the year and are once more in an attractive condition. A proposal to allow football to be played on the main lawn was successfully resisted. The Economic Section which was so badly damaged by the hurricanes of 1928 and 1930 will in the near future receive attention.

3. The Lime Experiment Station destroyed by hurricanes and disease has been replanted and the young trees are making satisfactory growth. As Mr HARCOURT points out this Station serves the purpose of demonstrating sound agricultural practices, but is not suited for accurate plot experiments involving replications etc. Stock trials are in progress and suggestions have recently been made to standardise growth measurements etc. bringing them into line with the practice in Trinidad and St. Lucia.

4. The nursery work carried on by the Department has been maintained on a large scale. During the year close on 50,000 budded plants were distributed from the Government nurseries. In addition to the increased numbers there has also been a considerable improvement in the quality of the plants sent out which means that a larger percentage stands a good chance of becoming established trees. In the cases of oranges and grapefruit, in future, trees will only be sent from the nurseries after they are suitably headed.

5. Experiments with wither-tip immune limes continue and further crosses have been developed which will be planted out in due course. Similar work is being carried on by the Trinidad Department of Agriculture. The problem is of sufficient importance to justify the attention of both Departments, more especially as the Dominica work is with both the Woglum and the Philippine forms whereas the Trinidad work is confined to the West Indian—Philippine crosses. Valuable assistance has been rendered by the Imperial Institute in testing the suitability of the essential oils derived from the different forms and in reporting on their probable commercial value.

6. The value of lime exports from Dominica continues to decline and it is feared that it will take at least another year before there will be a turn in the tide. A new method of estimating crop returns has been evolved to take the place of the old method which was based mainly on the exports of concentrated juice and citrate of lime, products which are no longer manufactured.

7. With the loss of the juice market, both raw and concentrated, and with the uncertainty of the continuance of high prices for lime oils when larger supplies become available following the increased production from new plantings both in Dominica and in other West Indian Islands every effort should be made to develop the green or fresh lime market. A scheme for advertising green limes in the United States of America is now under consideration and there will be need for renewed efforts in popularising limes in Great Britain and Canada. This should engage the serious attention of planters and others in Dominica.

8. A census has been taken of the area planted in citrus other than limes and it is estimated that 390 acres are now planted in grapefruit and oranges of which 80 acres are in bearing. With the approaching completion of the planting up of areas best suited to lime cultivation it is to be hoped that planters will now consider the advisability of extending grapefruit cultivation and arrangements are being made by the Department to stock large numbers of grapefruit plants in the Government nurseries.

9. The report deals fully with the questions of agricultural instruction, the Copt Hall land settlement scheme and the work of the Government Marketing Depot. The assistance rendered by Mr. A. C. SHILL, the Marketing Officer, in organising the latter is gratefully acknowledged.

10. The staff of the Department was more than usually depleted during the year by transfers, leave and retirement, nevertheless, the report shows a record of good work performed under difficult conditions.

I have the honour to be,

Sir,

Your obedient Servant,

G. A. JONES,

*Acting Commissioner of Agriculture,
Imperial College of Tropical Agriculture.*

His Honour

The Administrator.

DOMINICA, B. W. I.

REPORT ON THE AGRICULTURAL DEPARTMENT, DOMINICA.

FOR THE YEAR ENDED 31ST DECEMBER, 1932.

THE BOTANIC GARDENS.

THE Botanic Gardens which were so badly devastated by the hurricane of 1930, have owing to favourable weather since experienced, the care and attention given to surviving specimens, and the planting of new introductions, both decorative and economic, now regained their former attractive appearance.

The lawns have also made complete recovery and are once again one of the main features of the Gardens.

Among the flowering plants which proved a source of attraction and interest to visitors, the following are worthy of mention :—*Ixora odorata*, *Baikiea insignis*, *Butea frondosa*, *Bougainvillea lateritia*, *Jacaranda mimosæfolia*, *Cassia nodosa*, *Carissa grandiflora*, *Mono-dora tenuifolia*, *Congea tomentosa*, *Thunbergia grandiflora*, *Colvillea racemosa*, *Warscewiczia coccinea*, *Brownea kewensis* and a species of *Stapelia*.

In addition to the usual maintenance work, particular attention has been devoted to pruning and shaping trees and the general renovation of borders containing flowering shrubs. Additional beds of decorative plants such as *Euphorbia pulcherrima*, *Clerodendron ugandense*, *Galphimia brasiliensis* and varieties of *Hibiscus* provided colourful contrasts to the surrounding greenery.

The economic section of the Gardens is in course of being remodelled, and plots of other economic plants have been established in the room of cocoa etc., which on account of hurricane damage and old age had become depleted. New plantings include Tangerines, Grapefruit, Oranges, Pineapples and a collection of named varieties of Avocado pears. Some of the plots are still being utilised for nursery work and the trial of cover crops, of which *Crotalaria oocarpa* is proving very promising.

NURSERIES AND PLANT DISTRIBUTION.

Work in the nurseries continued to form one of the Department's principal efforts during the year, and the following table gives the number of economic plants distributed under the Plant Distribution Scheme which is financed from Imperial funds. The figures for previous years since the inception of the scheme in 1927 are also given.

NURSERIES AND PLANT DISTRIBUTION.

<i>Name of Plant.</i>	<i>Total for 3 years 1927-29.</i>	<i>Total for 1930.</i>	<i>Total for 1931.</i>	<i>Total for 1932.</i>	<i>Total for 6 years. 1927-32.</i>
Washington Navel Orange	2,812	778	1,427	2,188	7,205
*Budded Oranges (Other)	—	17	78	491	586
†Grapefruit	3,568	1,633	5,048	6,267	16,516
Portugal Orange	90	53	19	28	190
Mandarin	46	13	27	117	203
Sweet Lime	38	36	19	83	176
Tangerine	63	50	9	68	190
Seedling Lime	40,220	1,500	—	—	41,720
W.I. Limes (Bud. & Graft.)	7,299	24,100	26,453	31,691	89,543
Limes (Other Varieties)	4,275	767	317	—	5,359
Lemon	1,051	1,691	1,246	50	4,038
Coconut	29,922	1,067	1,421	594	33,004
Cocoa	32,591	8,384	2,394	2,464	45,833
Coffee	101,116	4,725	16,439	937	123,217
Grafted Mangoes	687	323	231	60	1,301
Seedling Mangoes	92	94	58	12	256
Nutmeg	8,451	1,660	872	1,034	12,017
Tobacco	6,282	100	—	—	6,382
Mangosteen	352	8	—	—	360
Sour Orange	11,887	2,859	7,550	7,240	29,536
Papaw	2,194	40	154	—	2,388
Tannias	25,420	5,110	1,070	—	31,600
Camphor	363	—	—	—	363
Black Pepper	544	76	60	—	680
Onions	13,600	12,100	28,437	500	54,637
Sugar Cane Cuttings	26,643	—	—	—	26,643
‡Miscellaneous	12,951	17,777	21,699	6,958	59,385
	332,557	84,961	115,028	60,852	593,328

* Principally Valencia.

† Chiefly Marsh Seedless.

‡ Includes cuttings and plants for cover crop and mulch purposes.

It was estimated at the end of 1932, that 392 acres were planted in grapefruit and oranges. Of this total 40 acres of oranges and 40 acres of grapefruit are of bearing age.

Except for budded or grafted plants for which a nominal charge of 3d. is made economic plants are distributed free of charge, but reductions in the price of budded limes are sometimes made to assist particularly deserving cases amongst the peasantry.

A healthy demand for budded citrus, especially limes, was maintained and as the greater part of the lime area devastated by hurricanes and disease is now replanted, it is not anticipated that there will be as large a demand for limes in 1933. Greater attention has therefore been devoted to the propagation of citrus other than limes, for which there is an increasing demand. The varieties of grapefruit which are most sought after for new plantings are:—Marsh Seedless, Duncan and Foster. The pink Marsh or Thompson variety has been introduced for trial. The orange varieties besides Washington Navel which are being planted on a field scale include Valencia and Pineapple. Two new varieties, namely Hamlin's Early and Lamb's Summer, have been obtained with the object of trying to extend the orange season. The former variety is reputed to be earlier than the Navel and the latter later than Valencia.

There has been a gradual decline in the distribution of other economic plants, except in November when there was a marked interest in cocoa.

The propagation and training of orange and grapefruit plants is naturally more costly than that of raising limes. The latter form good heads with but little training, whereas grapefruit and oranges have to be staked and pruned in order to assure good heads being formed.

LIME EXPERIMENT STATION.

The nurseries near Roseau have been maintained and also the country nurseries at Soufriere, Hampstead, the Cabrits and Marigot. The Grandbay citrus nursery was closed down by reason of the small demand for plants in that district not warranting the expense of maintenance. The Cabrits nursery was overstocked with lime plants at the end of the year through growers failing to take delivery of orders placed. In consequence over 2,000 plants had to be disposed of free of charge to growers who it was considered were not in a position to pay for them. This nursery has since been considerably reduced in area and will shortly be closed down, but the other country nurseries will be maintained for the time being.

Budded and grafted Avocado pears and mangoes are also propagated to order. Experiments have been successfully conducted in crown grafting and budding mangoes on stocks grown in beds, thereby avoiding the protracted and more cumbersome method of approach-grafting by the use of stocks in bamboo pots suspended in trees. Particularly good results were also obtained in the patch and shield budding of Avacado pears.

The nurseries are well stocked for the coming year's distribution and it is anticipated that all ordinary demands will be met.

LIME EXPERIMENT STATION.

The Lime Experiment Station which in 1913 was taken over as an exhausted and partly abandoned valley, took its name from the manurial and other experiments with seedling limes, of which the recorded yields were annually published until the results were summarized, and the experiments discontinued in 1929 (Annual Report 1928-9, pp. 7-11.) The lime plots have since been nearly all converted into demonstration or trial plots of budded limes. In addition, plots of other permanent crops have from time to time been established. It is recognised that the plots are now, therefore, demonstration plots rather than experiment plots, although for convenience the Lime Experiment Station retains the name by which it has for so long been known.

The total area under cultivation is approximately 24 acres, of which limes occupy 11 acres. The value of good cultural methods, such as the use of cover crops and proper drainage systems are demonstrated throughout the station. The following account summarizes the published records of recent plantings, and gives some indication of the objects and progress of the trials. The plot names or numbers given are those used in earlier reports, but it is proposed shortly to consider the renumbering of the plots.

Plots 1 to 11 continue to be utilised for nursery work.

Plot 12 contains West Indian Limes on grapefruit stock.

Plots 13 to 21 constitute a triplicated series of trials of stocks for limes laid down in 1931. The stocks are grapefruit, sour orange and rough lemon. All the trees grew well during the year and many bore a few fruits. So far, there is no great difference in the behaviour of the stocks, but growth on grapefruit stock is the most vigorous.

Plots 22 to 24. These were planted with limes on sour orange stock in 1916, and with six plots of seedling limes constituted a triplicated series of manurial experiments. (Annual Report 1927-8, pp. 21-23). The seedling trees died from the effects of hurricane damage and Red Root disease. The budded trees are still vigorous and provide a striking demonstration of the value of the sour orange stock. Crop returns for these plots have never been high. This is, no doubt, due to the shallow soil and steeply sloping situation, but the intensive methods of cultivation followed, usually produce crops comparing favourably with those of many estates in the island. The yield in 1932 was at the rate of 93½ barrels per acre.

Plots: Spiny 1 and 2. These two plots of budded limes planted in 1914, also formed part of one of the earlier manurial experiments. They are in a more favourable position and on better soil than Plots 22-24, and their recorded crops have always been higher. That of 1932 was at the rate of 186 barrels per acre.

Trial comparing grafted with budded limes. Two plots of previously uncultivated land were cleared in 1928, and planted the following year, one with grafted, and one with budded limes. The trees are now well developed and have begun to bear. The grafted trees are of slightly more even growth.

LIME BREEDING WORK.

Plot: "Old Limes." In 1930 part of this area was laid down as a further trial comparing budded with grafted limes, but many of the trees were killed by root grubs the following year. Difficulties previously experienced in connection with the budding of limes having been overcome this trial was abandoned, and the vacant spaces filled with budded plants. The remainder of "Old Limes" was planted with limes budded on sour orange stocks.

Plot: "Jack's Well." This consists of four sections containing budded limes, planted at various distances.

Plot: "Martin's Field." This plot is on steep land and serves mainly to demonstrate the use of lemon grass and other cover crops as a preventative of soil washing by heavy rains.

As previously mentioned the cultivation of crops other than limes is demonstrated in the Experiment Station, the most important being grapefruit and coconuts.

Upper and Lower Grapefruit Plots. The Upper Plot was planted in 1914, and the Lower in 1915. They produced during the year under review a good crop of excellent fruit, which ripened rather late, and was picked in January, 1933, and exported, through the Government Marketing Depôt, to Bermuda and Canada. The following figures give details of the plots and of the prices realized.

Area.	..	..	.5416	acre.
Number of bearing trees	..	..	57	
Crop exported	..	..	162	crates.
Calculated yield per acre	..	..	299.11	crates.
Average yield per tree	..	..	2.8421	crates.
Net return	..	..	£ 54.	3. 9.
Calculated per acre	..	..	£100.	1. 0.
Return per tree	..	..	£ 19.	0. 0.
Return per crate	..	..		6. 8.

Coconut Plots. The coconut palms, most of which lost all their foliage in the hurricanes of 1930, appear to have recovered, and show signs of producing a few nuts in 1933. Hillside cultivation is demonstrated in particular.

LIME BREEDING WORK.

The F1 generation of West Indian $\times$ Woglum and West Indian $\times$ Philippine (*Aurantifolia*) planted in 1929, and grafted on Sour Orange stock have now nearly all fruited. The most promising were back crossed with the West Indian in 1931. Seedlings raised from these back crosses have been planted in nursery beds preparatory to being grafted.

One or two forms of West Indian lime which appear to be resistant to Withertip disease have been propagated and will be grown for observation purposes.

Through the kind assistance and co-operation of the owner of Sherwood Estate, samples of ecuelled oils of Woglum and Philippine (*Aurantifolia*) limes were sent to the Imperial Institute to ascertain how such oils compare with the ecuelled West Indian lime oil of commerce. The report is as follows:—

IMPERIAL INSTITUTE,
LONDON, S. W. 7.

O. 2057/3.

REPORT ON
LIME OIL FROM DOMINICA.

The two samples of lime oil which are the subject of this report were forwarded to the Imperial Institute by the Curator and Agricultural Superintendent, Dominica, and are referred to in his letter No. 301 of the 13th July, 1932.

The samples represented ecuelled oils prepared in the course of citrus selection trials which are in progress in the Island with a view to determining the most suitable variety of lime for cultivation, particularly in areas where the trees are liable to withertip disease. It was desired to ascertain their quality and value in comparison with the hand-pressed West Indian lime oil of commerce.

LIME BREEDING WORK.

Description.

The samples each consisted of about 1 pint of oil, and were stated to have been produced respectively from *Citrus aurantifolia* and Woglum's lime from the Sherwood Estate. Both were clear, greenish-yellow oils, but that from *C. aurantifolia* was very slightly paler than the oil from Woglum's lime.

The odour and flavour of the two oils were agreeable, but differed from those of commercial West Indian hand-pressed lime oil. The oil from Woglum's lime was much stronger in aroma and tests than the *C. aurantifolia* oil.

Results of Examination.

The oils were found to have the following constants, which are shown in comparison with the corresponding figures for the previous samples of oil from the same varieties of lime dealt with in Imperial Institute report of the 29th November, 1929, and the range of figures recorded for hand-pressed West Indian lime oil :—

	<u>Present Samples</u>		<u>Previous Samples</u>		Hand-pressed West Indian lime oils.
	<i>Citrus aurantifolia</i>	Woglum's lime	<i>Citrus aurantifolia</i>	Woglum's lime	
Specific Gravity at 15.5/15.5°C	0.8833	0.8852	0.8737	0.8590	0.878 to 0.902
Optical Rotation aD	* 53.23° at 27°C	* 52.37° at 27°C	* 53.40°	* 56.74°	* 30° to * 38°
Refractive Index nD	1.4833 at 20°C	1.4788 at 20°C	1.483 at 19°C	1.476 at 19°C	1.4820 to 1.4860
Aldehydes, expressed as citral, per cent *	3.28	9.29	—	—	6 to 9 **
Non-volatile matter, per cent	9.4	9.0	—	—	10 to 18
Solubility in 90 per cent alcohol at 15.5°C	Soluble in 5 vols. with very slight turbidity.	Soluble in 3.2 vols. to a clear solution.	Soluble in 7 vols. with slight turbidity.	Soluble in 6 vols. with slight turbidity.	Soluble in 4 to 10 vols. with slight turbidity.

* By hydroxylamine method (*Analyst*, 1930, 55, 107).

** Method of determination not stated.

The foregoing results show that the constants of the present samples differed from those of commercial hand-pressed West Indian lime oil principally as regards their optical rotations, which, as in the case of the samples from the same varieties previously examined, were considerably higher than those of the ordinary commercial product. As in the case of the earlier sample the Woglum's lime oil had a rather low refractive index. The two samples also differed considerably in their aldehyde content, and the amount of this constituent in the *C. aurantifolia* oil was lower than that usually recorded for hand-pressed lime oil.

Commercial Value.

The oils were submitted to (a) merchants and (b) and (c) two firms of essential oil distillers, who furnished the following reports :—

(a) "In both samples the optical rotation is much above the normal and the colour is distinctly paler and more "watery." The odour of the oil ecuelled from *Citrus aurantifolia* is decidedly of "terpenes," and that of Woglum's lime not quite so bad. Woglum's lime conforms more in colour and odour to the normal hand-pressed oil, but unless the "terpene" smell can be accounted for by age and exposure we cannot imagine that these oils would have any commercial value."

THE LIME INDUSTRY.

(b) "With regard to flavour, we find that the Woglum lime oil is equal to our stock, but that made from *Citrus aurantifolia* is definitely inferior, having a somewhat "fatty" taste."

(c) "We do not think the *Citrus aurantifolia* would have a market value as a product for essence manufacture. In our opinion, however, it could be used in perfumes of the Cologne type, but it would have to be rectified somewhat to free it from the residual odour and eliminate the turpentine smell."

"The Woglum's lime oil has a distinct lemon/limes flavour, but there is some residual flavour which comes through. The oil is very different from the ordinary West Indian hand-pressed oil sold on this market. In our opinion if the oil were rectified it could be used in essence manufacture, but not as a substitute for hand-pressed lime oil. This oil should also be useful in Cologne type of perfumery as it would give a sharp, fruity top note to a perfume."

It will be observed that while the firms are in agreement regarding the *Citrus aurantifolia* oil, the second firm expresses a rather more favourable opinion than the others on the quality of the Woglum's oil.

Remarks.

The further investigation of the oils from these two varieties of lime grown in Dominica indicates that the oil of Woglum's lime is the more suitable for the United Kingdom market, the general opinion being that in aroma and flavour it is superior to the *C. aurantifolia* oil. As, however, its constants differ from those of ordinary West Indian hand-pressed lime oil, the oil could not be offered under the latter designation and it would therefore appear necessary to develop a special market for it.

Since citrus oils are liable to oxidation they should always be shipped in completely filled receptacles. It is possible that deterioration from this cause may have taken place to some extent in the present samples, as the bottles were not completely filled, and this may perhaps account for the turpentine-like odour referred to by two of the firms consulted.

In view of this it would seem desirable that further samples of the oils should be forwarded in carefully filled bottles in order that trade opinions may be obtained on samples which have run no risk of deterioration by exposure to air.

It might also be worth while to investigate the possibilities of the distilled oil from these varieties of limes, as such oil might prove to be more readily saleable than the pressed oils. Distilled West Indian lime oil is now realising a relatively high price, viz. 36s. per lb. in London.

24 September, 1932.

THE LIME INDUSTRY.

In the aggregate, production of lime products during the year 1932 dropped to a lower level than in 1931. The reason for this decline is due to a combination of causes, the principal being that young budded trees planted since the ravages of root disease and hurricanes which virtually destroyed all seedling lime plantations, are only now approaching commercial bearing age. Production from young trees should be greater in 1933, and from then on will progressively increase.

Apart from the severe setbacks the industry has received in recent years from causes associated with hurricanes etc., a further serious blow has been dealt to the industry by manufacturers of citric acid deciding to discontinue the use of concentrated lime juice as a source of raw material. Practically no market now exists for concentrated lime juice, which for very many years has been the principal product of the industry and planters are now compelled to let lime juice run to waste after distillation for the oil, which is now the principal product of the industry. New processes have been discovered and developed for the manufacture of citric acid from products other than citrus fruit juices, which are proving more economical and popular with citric acid manufacturers. It has been known for a good many years that citric acid can be formed by fermenting sugar solution by means of certain moulds. From information received it is obvious that this process has been adopted in many countries, and in some instances where citric acid had not hitherto been produced. These developments have resulted in a considerable increase in the production

THE LIME INDUSTRY.

of citrate of lime and citric acid, and it is extremely unlikely that the price of sugar will ever rise sufficiently to prevent the fermentation process from being able to successfully compete with fruit juices as a source of citric acid. This is undoubtedly a heavy blow to Dominica as it is evident that there is very little prospect of a profitable market for concentrated lime juice being obtained unless a new use is discovered for this product.

There appears no reason to doubt that green limes, lime oil and to a certain extent raw juice will continue to find a market, and that the two former will in future have to be considered as the main commercial products of the industry.

From an agricultural aspect production is on a sounder basis than heretofore. The cultivation of the seedling lime has been abandoned in favour of the lime budded on the sour orange stock, which has proved itself to be more productive and resistant to disease and hurricane damage. It is estimated that approximately 1,000 acres have now been planted in budded limes, of which a fair proportion is already approaching bearing age. No little apprehension, however, is felt by planters who have spent so much time and money in rehabilitating their estates as to what the future will hold for them in the shape of markets for their products, especially as considerable impetus has already been given to lime planting in other parts of the Empire through Dominica's drop in production. With lime plantations in Dominica once again in full bearing, there is a definite danger of over-production in the future unless new markets are found.

Trial shipments of green limes to Canada and England recently made have met with satisfactory results, but the present demand is very limited and it is obvious that much propaganda work will have to be undertaken before the lime can successfully compete with the better known lemon.

In the meantime owing to the present low production, little difficulty is experienced in disposing of the crop in the form of oils, green limes and raw lime juice.

The exports of products of the industry during 1932 are recorded below :—

Products.	Quantity.	Value. £
Essential Oil (Distilled).	11,218 lbs.	13,271
Otto of Limes (Hand-pressed or ecuelled).	617 ,,	677
Green Limes	8,299 brls.	10,418
*Raw Lime Juice ..	62,545 gals.	2,910
Concentrated Lime Juice	5,561 ,,	193
Lime Juice Cordial ..	260 ,,	130
Pickled Limes	2 brls.	3
Oils in solution in Raw Juice exported ..	860 lbs.	1,811
		<u>£29,413</u>

* Includes all juice other than concentrated.

Owing to the complete collapse of the concentrated lime juice market, it is no longer possible to employ previous conversion tables for estimating in barrels of fruit the lime products annually exported.

Lime oils, which have not hitherto been taken into consideration, must now be used as a basis of estimation of products other than fresh fruit, instead of the juice export figures previously utilised, inasmuch as quantities of juice are now waste products after the oil has been extracted.

THE LIME INDUSTRY.

The determination of new factors has been complicated in view of the fact that few producers can supply definite records of the yield of oil per barrel of fruit, and also by the fact that there is a decided variation in such yields, not only on different estates, but also from year to year on the same estate. The factors determining these variations are well known to planters and need not be here explained.

It is generally agreed that an average recovery is $5\frac{1}{3}$ ozs. of oil by weight per barrel of lime fruits, i.e. 1 lb. distilled oil is recoverable from 3 barrels of fruit.

It is also considered that an average recovery of 2 ozs. ecuelled oil per barrel is obtainable, with a further recovery from the juice from ecuelled fruits of 2 ozs. of distilled oil, resulting in an average loss of $1\frac{1}{3}$ oz. per barrel through the dual process. Therefore if the exports of ecuelled oil (in lbs.) be multiplied by 8, this will give the barrels of fruit ecuelled, but a corresponding weight of distilled oil must be deducted from the export figures of distilled oil. Raw lime juice must also be taken into account, but the Treasury export figures are apt to be misleading as juices are included which contain little or no oil, as well as standard raw lime juice with full oil content. Therefore the barrels of fruit must be arrived at by converting the "oils in solution" figure on a basis of the oil recovery had the juice been distilled. The Treasury estimate of oils in solution for export tax purposes is based on a yield of 4 lbs. of oil being recoverable from 100 gallons of raw lime juice, whereas the calculated yield for conversion purposes would be $4\frac{1}{2}$ lbs. of oil per 100 gallons of raw juice when accepting an average yield of $7\frac{1}{2}$ gallons of raw juice per barrel of fruit containing an average oil content of $5\frac{1}{3}$ ozs.

Calculated by the foregoing empirical methods, the crop actually exported under various heads in 1931 and 1932 is estimated as follows:—

1931.		
Products.	Barrels of fruit.	Approximate percentage of total crop.
Distilled Lime Oil ..	36,864	54.20
Ecuelled Lime Oil ..	17,264	25.36
"Oils in Solution" ..	2,610	3.80
Green Limes	11,014	16.20
Pickled Limes	305	.44
Total ..	68,057	
1932.		
Distilled Lime Oil ..	31,803	66.38
Ecuelled Lime Oil ..	4,936	10.30
"Oils in Solution" ..	2,867	5.99
Green Limes	8,299	17.32
Pickled Limes	5	.01
Total ..	47,910	

The new conversion table is as follows:—

Ecuelled oil (lbs.) $\times 8 =$ Barrels of fruit ecuelled.

Total distilled oil (lbs.)—total ecuelled oil (lbs.) $\times 3 =$ Barrels of fruit uncuelled.

Oils (lbs.) in solution in raw lime juice $\times 3\frac{1}{2} =$ Barrels of fruit exported as raw juice.

For the purpose of comparison with former years, the following table gives the crop expressed in round numbers shipped annually since 1921. It does not necessarily represent yearly production, owing to the carry over from year to year of certain products.

MINOR INDUSTRIES.

<i>Years.</i>		<i>Barrels.</i>	<i>Remarks.</i>
1921	..	516,000	} Prior to appearance of Withertip.
1922	..	400,000	
1923	..	228,000	
1924	..	424,000	Includes large carry over from 1923.
1925	..	230,000	
1926	..	214,000	Hurricane and appearance of Red Root.
1927	..	210,000	
1928	..	205,000	Hurricane September 12th.
1929	..	133,000	
1930	..	114,000	Hurricane September 1st.
1931	..	68,000	
1932	..	48,000	

MINOR INDUSTRIES.

Somewhat slow if definite progress has to be reported of most of the minor industries, for although there has been a steady increase in the amount of crop exported following recovery from hurricane damage, prices have been with few exceptions so low as to offer but little incentive to improving yields or bringing recent plantings into early bearing.

The result has generally been that young cultivations have received little serious attention and supplies in the older cultivations could not be generously treated. In a word, good cultural measures have been mainly confined to the best bearing trees.

While on the surface the outlook is still rather gloomy, there are considerable areas under permanent cultivation that can and no doubt will be brought into a higher state of productivity so soon as market conditions improve. This applies to the peasant proprietors as well as to the larger estates.

The peasants have been turning their attention more and more to the production of home-grown food crops, over-production having resulted in a bad glut. Fresh land is constantly required for this purpose and in consequence there has been a marked increase in the exports of forest products. Unfortunately, the methods adopted lead to at least temporary exhaustion of lands so utilised and greater ultimate difficulty in establishing permanent crops and exportable products.

Bay Oil, Cocoa, Coffee and Coconut Products. The exports which have noticeably increased largely through recovery of established cultivations include bay oil, cocoa, coffee, and copra. In all these cases, especially the latter, much larger exports can be expected when prices rise sufficiently to warrant intensive methods of cultivation. Four large estates have copra driers, and the surplus of peasants' nuts not consumed locally are shipped to neighbouring islands.

The Department has made repeated efforts to introduce trees of the true Bay into the Carib Reserve, with indifferent success. It is now proposed to investigate whether a market can be found for the so-called inferior variety, having an odour of "Citronelle" and yielding a low percentage of phenolic compounds. This type abounds wild in the Reserve and in the Lasoye District.

Bananas. There has been a small but steady increase in the trade with Antigua. Fairly extensive plantings have been made on one large estate and hopes are entertained that a considerable export trade in this fruit will be established in the near future. Undoubtedly the development of such a trade if fairly extensive, would go far in solving many of Dominica's economic problems, as small holders would be able to participate to a great extent, but it would require to be built up on sound lines, calling for considerable capital and definite fixed arrangements as to transport and market.

Other Fruits. There has been much improvement in the quantity and quality of other fruits shipped, and the total quantity has been doubled. This trade is dealt with in this Report under Government Marketing Depot. Unfortunately the citrus season finished rather early, and later bearing varieties are under trial.

Spices. Interest in vanilla and ginger has dwindled with unremunerative markets, but some of the plantings of the former are receiving just sufficient attention to keep the plants alive until there is enough inducement to fertilise the flowers. Ginger is still grown on a small scale and plants will be available for future extension, if necessary.

CHIEF EXPORTS.

Rum. The attempts to popularise Dominica Rum in Montserrat, Antigua and elsewhere have met with encouraging results and over 11,000 gallons were exported as compared with 1,300 in 1931. There is still a surplus, however, and the price of syrup largely produced by the peasantry has slumped.

CHIEF EXPORTS.

TABLE OF AGRICULTURAL EXPORTS FOR THE TRIENNIAL PERIOD
1930 TO 1932.

	1930.	1931.	1932.
<i>Lime Products :</i>			
Concentrated Juice ..	45,832 gals.	3,211 galls.	5,561 galls.
Raw Juice	195,994 "	93,255 "	62,545 "
Lime juice Cordial ..	201 "	324 "	260 "
Distilled Oil	25,677 lbs.	14,446 lbs.	11,218 lbs.
Ecuelled Oil	1,551 "	2,158 "	617 "
Green Limes	17,461 brls.	11,014 brls.	8,299 brls.
Pickled Limes	82 casks.	123 "	2 "
<i>Cocoa Products :</i>			
Cocoa, Raw	409,536 lbs.	218,773 lbs.	260,099 lbs.
Cocoa, Prepared ..	36 "	57 "	97 "
<i>Coffee Products :</i>			
Coffee	383 lbs.	87 lbs.	396 lbs.
<i>Coconut Products :</i>			
Coconuts	96,802	50,355	116,140
Copra	113,831 lbs.	45,526 lbs.	107,107 lbs.
<i>Sugar Products :</i>			
Rum	68 galls.	1,380 galls.	11,520 galls.
<i>Spices :</i>			
Vanilla	7,678 lbs.	144 lbs.	1,974 lbs.
Nutmeg	£3	—	£2
Ginger	£108	£20	£38
<i>Various Products :</i>			
Bananas	2,453 bunches	1,556 bunches	9,019 bunches
Oranges	1,017 crates	5,271 crates	7,513 crates
Mangoes	3,363 "	4,006 "	6,743 "
Grapefruit	917 "	1,531 "	3,954 "
Pears	£454	670 "	1,550 "
Miscellaneous Fruits ..	£1	£47	£9
Bay Oil	15,948 lbs.	17,783 lbs.	20,915 lbs.
Orange Oil	2,835 "	830 "	443 "
Vegetables	£120	£129	£123
Farine	£4	£1	£7
Hides & Skins	£38	—	£18
Leather Unmanufactured.	£137	£31	£59
Turtle Shells	168 lbs.	388 lbs.	220 lbs.
Baskets	5/-	—	£7
Tobacco & Cigars ..	—	—	3,640 "
<i>Forest Products :</i>			
Hardwood	38,822 feet	20,840 feet	65,248 feet
Firewood	298 cords	22 cords	212 cords
Canoe Shells	£57	£39	£133
Shingles	£6	£2	£8
Charcoal	£1	£1	£15
Locally made boats ..	£33	£25	£162
Total values	£109,059	£68,938	£50,736

LEGISLATION AFFECTING CROPS.

INSECT PESTS AND FUNGOID DISEASES.

Root Grubs. (*Lachnosterna* sp., *Diaprepes* sp., etc.) were responsible for the loss of many young citrus plants during the year, both in the field and in the nursery. It is not easy to combat such soil pests owing to the difficulty in determining their presence early enough to attempt their destruction before fatal injury is caused to the plant. Measures recommended in previous reports for the control of these pests have met with partial success, especially the hand-picking of the adults from the plants when these are prevalent and eating the leaves. The Commissioner of Agriculture has recommended for trial certain vaporous poisons for injecting into the soil, but owing to the difficulty in determining the early presence of the grub the use of these soil fumigants would prove somewhat costly over extended areas suspected of being affected.

Scale Insects. Where proper cultural methods have been employed these pests have not been very troublesome. Serious scale attacks are almost invariably due to the general unhealthy condition of the plant brought about by errors in cultivation and if these are corrected it is usually possible to keep them under control by periodically spraying with kerosene emulsion. One error often to be observed is inadequate protection of the plant from wind, and under such conditions plants are frequently severely affected by scale. The use of temporary light wind-breaks of pigeon peas or tephrosia in addition to the permanent breaks will go far in improving the condition and materially assist in keeping these pests under control.

Withertip and Blossom Blight of Limes (*Gloeosporium limetticolum*) were more in evidence during 1932 than in the previous year especially in the Northern District where areas of seedling lime cultivations still exist.

Root Diseases of citrus are being effectively combatted by the use of resistant stocks, of which the sour orange is most widely used. Grapefruit and rough lemon stocks, however, appear of greater promise on the laterite soils prevailing in sections of the Northern and Windward Districts.

Citrus Scab was not as troublesome as during the previous year, and was kept under control in nurseries by spraying with Burgundy mixture or Bordeaux mixture. The latter mixture with resin used as a "sticker" appeared to be the more effective.

Plants of violets and *Acalypha* were forwarded to be examined by the Mycologist of the Imperial College of Tropical Agriculture and found to be attacked by a *Rosellinia*, probably *R. bunodes*.

LEGISLATION AFFECTING CROPS.

In 1898 a law was passed with a view to the prevention of the importation of articles likely to introduce diseases of plants, since which time further legislation has been enacted with reference to specific diseases and insect pests. A summary of Laws, Orders and Proclamations then in force was given in the report for 1929-30. These have now been revised, simplified and collected under Statutory Rules and Orders No. 12 of 1932, and the earlier proclamations rescinded accordingly.

The provisions of such of the above as require the examination and/or fumigation of planting material not absolutely prohibited from entry are carried into effect by the agricultural officers on notification by the Treasurer and Comptroller of Customs.

The particular attention of planters is drawn to the fact that soil is prohibited entry into Dominica from all outside places. The danger of introduction of pests and diseases by means of soil imported with plants is recognised in all quarantine practice.

With regard to the exportation of plants, certificates of inspection are issued in accordance with the requirements of the country of destination.

The most important of the laws relating to the exports of products concerns the exportation of fruit. Under the Exportation of Fruit Ordinance, 1929, Statutory Rules and Orders No. 17 of 1931 were expressly designed for the further improvement of the quality, grading, wrapping and packing of citrus and other fruits. The Officer-in-Charge of the Government Marketing Depot is the Chief Fruit Inspector under these Orders, which rescind other recent Statutory Rules and Orders. He is also an Examiner of Vanilla, and Secretary of the Fruit Trade Committee.

VISITS BY OFFICERS OF THE DEPARTMENT AND AGRICULTURAL INSTRUCTION.

A fairly extensive programme of visits to estates and peasants' holdings was carried out, although the temporary reduction of staff made it impossible to do this work on so large a scale as in the previous year. One of the principal objects in visiting planters was to advise on the planting and care of young budded trees distributed by the Department. Many growers called at the Department's Offices and nurseries to talk over their problems and to arrange for supplies of plants. Various estates and holdings were inspected in connection with the administration of Loan Board funds.

Although the interest shown by peasants in the planting of permanent crops, such as limes, cocoa, coffee and coconuts has increased, development in this direction was slow. This was largely due to the fact that the products of such crops realised prices which were not very encouraging, and provided little funds for further planting. Advice offered to the more progressive peasants appeared to be generally appreciated, and their methods of cultivation show steady, if rather slow, improvement.

Pupils. In 1925 it was decided to revive the system of training six pupils in the Department and towards the end of that year four young men were selected by examination. This number was increased to six during the following year. A course of fairly extensive training was arranged to cover a period of two years.

Following the severe hurricane in 1928 and the wide spread outbreaks of root diseases which followed and which caused the rapid dying out of seedling lime plantations, it was incumbent on the Department to propagate large numbers of limes budded on hurricane and disease resisting stocks. In order to expedite this work it was necessary to engage a fairly large number of youths and to give them special training in citrus propagation. These young men were specially selected by examination for their general intelligence and were obtained from all parts of the island, many being the sons of overseers or peasant proprietors. Most of these youths quickly became efficient in budding and grafting, and the Department considered that it would be definitely in the interests of agriculture in Dominica and of the young men themselves if they were given the opportunity of gaining some wider practical and theoretical training. Consequently the original scheme of giving six pupils a fairly extensive training was discontinued and all the youths selected for temporary employment in the Department were given instruction in general agricultural matters in addition to specialised training in citrus propagation. The period of training remained the same and usually these youths were engaged on probation for several weeks before being accepted as pupils.

One of the principal objects in giving this training was that on its completion, the young men could return to their own villages and apply improved cultural methods in assisting parents and relatives in the cultivation of their holdings. Obviously these young men could not receive so thorough a training as was previously given to a smaller number. Nevertheless the training received made them better fitted to engage in agriculture either on estates or at their homes, and it is worthy of note that a number are now holding responsible positions either in Dominica or abroad.

In 1932 the average number of probationers and pupils employed in the main nurseries of the Department was eighteen, and all were given opportunities to observe and to gain experience in the practical work of various sections of the Department, such as the Lime Experiment Station, and the Government Fruit Farm. Practical work performed by pupils included preparation of nursery beds, sowing seeds, planting stocks, budding and grafting citrus, avocado pears, and mangoes, pruning fruit and cocoa trees, potting plants, trimming hedges, lining and draining citrus plots, preparation of planting sites, planting citrus trees, preparing and applying insecticides and fungicides and keeping crop records, labour books, and cost accounts. Courses of lectures on Botany, Soil and Manures and General Agriculture were given. Full notes on these lectures are kept by the pupils and marks are awarded. The more instructive and varied practical tasks are usually given to the keenest and most promising pupils, who also receive a more advanced theoretical training.

Two youths were recruited from the Carib Reserve in 1932 to receive the course of training outlined.

It is proposed to continue the present system of training so long as the extensive nursery work of the Department is continued and later to revert to the more intensive training of fewer pupils such as was recommenced in 1925.

AGRICULTURAL EXHIBITION.

NORTHERN DISTRICT. Owing to the absence on six months' vacation leave of the Assistant Agricultural Officer stationed in this district, it was impossible to fully maintain the usual services, but other members of the staff paid occasional visits to the nurseries and principal estates. Three citrus nurseries were maintained in good order, but the supply of budded citrus, particularly limes, was in excess of the demand and in consequence large stocks of limes were on hand towards the end of the year, and were distributed free to deserving cases in order to release land for future work. It is proposed to close down the Cabrits nursery so soon as existing stocks are cleared. The Marigot and Hampstead nurseries will be maintained for the time being in view of an anticipated increased demand for grapefruit plants. Stock trials are being conducted on a small scale at these nurseries and a small collection of fruit trees are grown for the purpose of providing propagating material.

Eight youths are regularly employed in propagating work and these young men together with a few others in the district are given some further instruction in other agricultural and horticultural operations. Peasant proprietors have been encouraged to do their own budding, and demonstrations were given in this work by the senior budders.

Ten schools in the Northern District were regularly visited and the Head Teachers given advice and the children lessons in garden management etc.

SOUTHERN AND EASTERN DISTRICTS.

The Travelling Agricultural Instructor travels in the Southern and Eastern Districts, following up plants distributed from the Department's nurseries and advising peasants and small holders on general agricultural matters.

Practical demonstrations were also given in the top-working of seedling mangoes with the Julie variety. Overseers of estates and peasant proprietors received instructions in this work with the result that it is now being continued by them under the supervision of the Travelling Agricultural Instructor. It is estimated that 500 seedling trees were successfully top-worked in 1932.

Gardens are now attached to every school in these districts, and are periodically visited and advice and demonstrations given to the teachers and senior pupils.

Several visits were also made to the Carib Reserve with the object of getting the Caribs interested in the cultivation of the "Canelle" variety of Bay tree, and to advise the destruction of inferior varieties. Twelve hundred plants of the "Canelle" variety were distributed free to the Caribs and were planted under the supervision of the Travelling Agricultural Instructor.

The Travelling Agricultural Instructor paid frequent visits to the Northern District while the Assistant Agricultural Officer stationed in that district was on leave.

AGRICULTURAL EXHIBITION.

The Canadian Trade Exhibition Cruise Ship, S.S. "New Northland", which toured the West Indies in 1932, visited Dominica from the 23rd to the 25th of January. Conducted tours, which included visits to the Botanic Gardens and the Department's trial grounds, were arranged for the visitors.

The Department arranged for and staged an exhibition of local commercial products at Government House, a special feature being a display of citrus fruits, chiefly limes, oranges and grapefruit, specially selected and prepared for export. The exhibition created much interest, and was greatly appreciated. Officers of the Department were in attendance for the purpose of giving information concerning the various exhibits.

The thanks of the Department are extended to producers for supplying the bulk of the exhibits and to all who in other ways assisted in making the exhibition such a success.

DETAILS OF ADMINISTRATION.

DETAILS OF ADMINISTRATION.

EXPENDITURE.

	£	s.	d.
Personal Emoluments	1,385	10	4
Contingencies	10	2	10
Travelling Expenses	69	12	7
Maintenance of Botanic Gardens	309	8	10
Cultivation Saleable Products, etc.	271	15	7
Purchase Special Manures	50	8	2
Printing Reports etc.	28	10	5
Experiment Station	324	15	4
Upkeep of Morne Bruce Lands & Military Cemetery	19	1	0
Chemicals & Apparatus	4	8	7
Upkeep of Horses & Mules	29	13	10
Rent of Quarters for Assistant Agricultural Officer.	30	0	0
Travelling Allowance to Assistant Agricultural Officer Northern District	87	15	0
Agricultural Instruction	523	19	5
	£3,145	5	11
Grant for Nursery Work & Plant Distribution ...	£1,365	12	8

RECEIPTS.

Limes	£ 87	12	2½
Cocoa	36	4	3
Plants	400	4	11½
Fruit	48	15	0½
Onion Seed	9	9	3
Vegetable Seed	2	3	4
Miscellaneous	6	12	8
Laboratory Receipts	40	4	6
	£631	6	2½

EXCHANGE OF PLANTS, SEEDS, ETC.

Contributions of plants, seeds or budwood received during the year included the following :—

- Antigua, Agricultural Department. Seed of *Pithecellobium unguis-cati*.
- Prof. Juan Balme, Mexico. 26 packets of seeds.
- Mr. E. M. Dickens, Florida. A collection of seeds.
- Dr. D. Fairchild, U. S. Department of Agriculture. 23 packets of seeds including *Crotalaria* spp.; budwood of Avocado pear varieties and of Lamb's Summer orange.
- Mr. S. Haweis, Dominica. Seeds.
- Mr. R. C. Otway, Montserrat. Budwood of a variety of tangerine.
- St. Croix, U.S. Department of Agriculture. Budwood of Avocado pear varieties.
- Trinidad, Department of Agriculture. Budwood of Dancy tangerine and seed of a variety of Star apple.

Recipients of plants, seeds or budwood from the Department included the following :—

- Antigua, His Excellency the Governor of the Leeward Islands. A collection of decorative plants.

- Antigua, Agricultural Department. Budwood of citrus varieties.
- Mr. H. Buckley, Florida. Seed of *Pitcairnia* sp.
- Coconut Grove Arboretum, Florida. 3 packets of palm seeds.
- Mr. E. M. Dickens, Florida. 6 packets of seeds.
- Kew, Royal Botanic Gardens. Seed of "Balais Savanne".
- Lower Segama Rubber Estates, Ltd., British North Borneo. Seed of *Coffea stenophylla*.
- Montserrat, Agricultural Department. Budwood of Washington Navel orange.
- Mr. R. C. Otway, Montserrat. Citrus plants.
- Manila, P. I., Department of Agriculture and Natural Resources. Budwood of cocoa varieties.
- St. Croix, U.S. Department of Agriculture. Budwood of mango varieties; lime seed.

GOVERNMENT MARKETING DEPOT.—PEASANTS' INFORMATION BUREAU,

St. Kitts, Agricultural Department. Budwood of orange varieties.
 St. Lucia, Agricultural Department. Budwood of orange varieties.
 Trinidad, Department of Agriculture. Budwood of lemon varieties.

CORRESPONDENCE AND DISTRIBUTION OF INFORMATION ON AGRICULTURAL MATTERS.

Six hundred and thirty-six letters were despatched and six hundred and seven Minute Papers dealt with, in addition to numerous Confidential Minute Papers. Over eight hundred bills were despatched during the year. Various pamphlets and copies of reports were distributed to planters interested.

VISITS TO THE DEPARTMENT.

His Excellency Sir Reginald St. Johnston, K.C.M.G., Governor of the Leeward Islands; His Honour W. A. Bowering, C.B.E., Administrator, Dominica; F. A. Stockdale, Esq., C.M.G., C.B.E., Agricultural Adviser to the Secretary of State for the Colonies; Prof. H. A. Ballou, M.Sc., Commissioner of Agriculture for the West Indies; Dr. David Fairchild, Agricultural Explorer, United States Department of Agriculture; G. A. Jones, Esq., Assistant Commissioner of Agriculture for the West Indies; A. E. Collens, F.I.C., F.C.S., Government Chemist, Leeward Islands; J. R. Bange, Esq., Agricultural Department, Surinam; Delegates from the Northern Islands to the Cotton Conference, Barbados.

LABORATORY WORK.

The following tests were made during the year:—

Raw Lime Juice	..	..	17
Bay Oil	..	..	535

Milk testing is undertaken by the Assistant Agricultural Officer stationed in the Northern District.

GOVERNMENT MARKETING DEPOT AND PEASANTS' INFORMATION BUREAU.

The Government Marketing Depot as it functions to-day has developed through successive stages from the start made when the Peasants' Information Bureau was opened in July, 1926. At first the work of the Bureau was mainly assisting small holders in marketing, and making advance payments on non-perishable products. Perishable products such as fruit were only handled in small quantities. The activities of this branch of the Agricultural Department were extended in 1929 to include the preparation and marketing of fruit for export. A Government Trade Agency and Central Packing House were established and the Officer in charge of the Bureau was appointed Government Trade Agent and Chief Fruit Inspector. The original premises were totally inadequate for this extension of business and a larger building was acquired and fitted as a Central Fruit Packing House, the office of the Bureau being also accommodated in the new building. Arrangements were made by which packing charges etc., on fruit marketed by the Government Trade Agent need not be paid by producers until the receipt of account sales. This virtually amounts to advancing a considerable proportion of the value of the produce, and the Trading Account of the Bureau was utilised for this purpose.

Following recommendations made at a Fruit Conference held in St. Lucia in December, 1930, the titles Government Trade Agent and Government Trade Agency were changed to Officer-in-Charge, Government Marketing Depot, and Government Marketing Depot respectively.

The facilities at the Depot were much improved in 1931 by the installation of cold storage chambers and modern citrus packing house machinery. The latter is the property of a company who had recently acquired plantations of oranges and grapefruit trees of bearing size and which had long previously been neglected. With the greater production of exportable fruit from these areas, and from other producers who were taking the industry seriously, the full benefit of the improved facilities provided was first experienced in 1932.

Although the activities of the Marketing Depot have progressively increased, those of the Peasants' Bureau have declined. The reasons for this decline are principally the fall in production of non-perishable products grown by peasants, and the depressed state of the world's markets which makes it impossible to market small parcels of produce at remunerative rates. This uncertainty of the market has encouraged the small producer to dispose of his produce to local dealers.

The following table shows the extent of the activities of the Peasants' Bureau and Marketing Depot in recent years:—

GOVERNMENT MARKETING DEPOT.—PEASANTS' INFORMATION BUREAU.

<i>Period.</i>						<i>Cost or estimated value of total produce handled.</i>	<i>Cost or estimated value of fresh fruit handled.</i>
* April 1st, 1928—March 31st, 1929	...	...	...	...	...	£1,366	£491
" " 1929— " " 1930	...	...	...	...	...	£1,278	£749
" " 1930— " " 1931	...	...	...	...	...	£906	£870
† " " 1931—Dec. " 1931	...	...	...	...	...	£1,514	£1,470
Jan. " 1932— " " 1932	...	...	...	...	...	£4,863	£4,863

* Severe hurricane experienced.

† A nine month period.

The increase in value of produce handled in 1932 is not relatively quite so great as it appears, since the figures for the preceeding years are for local values, i.e. roughly the f.o.b. value less packing costs.

The operations of the Government Marketing Depot during the year ended 31st December, 1932, being essentially mostly of a business nature are best illustrated by the following tabular statement of the quantities and values of various produce packed and marketed. The quantities shown do not include green limes exported to the United States or most of the exports to neighbouring West Indian Islands.

Produce.	Pack- age size in cub. ft.	Packed but not mar- keted by the Depot.				Packed & Marketed by the Depot.				Total packed by Depot.			
		Quantity.	Estimated f.o.b. value.			Quantity.	Estimated f.o.b. value.			Quantity.	Estimated f.o.b. value.		
			£	s.	d.		£	s.	d.		£	s.	d.
Oranges	2	355	161	2	0	2930	1606	4	0	3285	1767	6	0
Grapefruit	2	1448	674	16	0	1929	826	16	0	3377	1501	12	0
Green Limes	2	558	433	18	0	362	289	1	0	920	722	19	0
Lemons	2	12	4	0	0	58	49	16	0	70	54	0	0
Tangerines	$\frac{3}{4}$	3		15	0	39	9	15	0	42	10	10	0
Philippine lime	2	27	10	14	0	66	28	10	0	93	39	4	0
Avocado Pears	$\frac{3}{4}$	1175	238	6	0	575	116	10	0	1750	354	16	0
Mangoes :													
Ordinary	2	673	235	11	0	167	53	14	0	840	289	5	0
Grafted	$\frac{3}{4}$	84	21	0	0	141	35	5	0	225	56	5	0
Sweet Potatoes	1 $\frac{1}{4}$	—	—			23	4	17	0	23	4	17	0
Coconuts	Bags	1		14	0	7	3	18	0	8	4	12	0
Pumpkins	Brls.	—	—			4	2	16	0	4	2	16	0
Cabbages	Brls.	—	—			9	8	5	0	9	8	5	0
Sapodillas	$\frac{3}{4}$	2		8	0	—	—			2		8	0
Pineapples	2	5	1	10	0	—	—			5	1	10	0
* Sundry Vegetables.	1 $\frac{1}{4}$	7	1	8	0	218	43	12	0	225	45	0	0
		4350	1784	6	0	6528	3078	19	0	10878	4863	5	0

* String beans, Egg plants, Ochroes, Tomatoes.

GOVERNMENT MARKETING DEPOT.—PEASANTS' INFORMATION BUREAU,

In the foregoing table the exports of any one product are reduced to the most common factor and f.o.b. values are estimated by approximately averaging from the account sales received to the 31st December, 1932. Negotiations of sales of a fair quantity of fruit were made by the Depot on behalf of growers to local dealers. These are not shown as marketed by the Depot. The figures shown give the approximate weighted average f.o.b. values for each crop exported for the year and when compared with the corresponding total Packing House costs give the respective nett returns to the growers for the actual produce. These for the principal crops are as follows :—

<i>Produce.</i>	<i>Package Volume cubic ft.</i>	<i>Approximate average f.o.b. return from account sales received.</i>	<i>Packing House cost.</i>	<i>Nett return to grower.</i>
Oranges	2	12/-	3/6	8/6
Grapefruit	2	10/-	3/6	6 6
Limes	2	10/-	3/3	6/9
Mangoes Grafted ...	$\frac{3}{4}$	4/-	1/6	2/6
Mangoes Ordinary ...	2	7/-	3/3	3/9
Pears	$\frac{3}{4}$	4/-	1/6	2/6

The mango exports were less than in 1931, but the prices realised were better, averaging about 1d. nett per fruit to growers for grafted varieties and 2/6 per hundred for other varieties. As in previous years Bermuda provided the chief market. The crop season was generally shorter than in the previous year and towards the end of the season the majority of the seedling mangoes had to be rejected on account of fruit fly damage, otherwise exports would have continued for a further six weeks. The avocado pear exports increased appreciably and prices were remunerative; the principal market being Bermuda.

Trial shipments of pears and mangoes to Canada and England were not very successful, the principal difficulty being that these fruits ripen very fast after removal from cold storage, not therefore allowing a sufficient marketing period. In this respect mangoes gave better results than pears, the variety Ceylon No. 1 Mango showing better keeping qualities than the Julie. For several years the Agricultural Department has made trial shipments of limes to Canada with the object of getting the lime better known and during 1932 this was continued, regular shipments being made during the summer months. Supplies for this purpose were obtained from the Department's Lime Experiment Station and supplemented by supplies from private growers. The average nett return for the Montreal shipments after deducting all packing and shipping charges was 3/4 per 20 lb crate, which is equivalent to 22/- per barrel. The Depot has been advised by its Brokers in Montreal that the "Chain Stores" had become interested in green limes and were selling them in small cartons. There is every prospect of the export of green limes to Canada considerably increasing in 1933.

The 1932-33 orange and grapefruit exports promise to be heavier than those of 1931-32. This is due principally to a lowered cull percentage resulting from better picking and general handling of the fruit. The general pack and grade of the fruit exported has received many favourable comments from all destinations both from the trade and from consumers. The principal marketing difficulty has been the fact that the navel oranges shipped have run more on the large size this season. Large oranges are not sought for by the trade. The present policy is to ship such fruit provided that returns received prove remunerative. As is usual, outsizes of grapefruit, large and small have not sold readily. Oranges were marketed principally in Canada and Bermuda, and grapefruit in Canada and England.

Mr. SHILL, the Marketing Officer for the Leeward and Windward Islands continued to make Dominica his headquarters during the year, and on his advice and with his practical assistance considerable improvement has been effected in the organisation of the Marketing Depot. The assistance given by Mr. SHILL is much appreciated by the Department.

GOVERNMENT FRUIT FARM.

The improvements effected in organisation together with the help of the citrus packing house machinery and the increased efficiency of the staff now permits of larger shipments of fruit being made with greater ease than in the past.

Expenditure.

Personal Emoluments	...	...	...	...	£554	15	3
Packages	...	...	...	...	998	1	0
Equipment	...	...	...	...	45	8	6
Trial shipment of fruit	...	...	...	...	33	13	3
Clerical Assistance & Wages of Staff...	...	...	...	...	63	18	6
Other Charges	...	...	...	...	59	9	11
					£1,755	6	5

Receipts.

Total receipts for ice sales	...	...	...	...	£462	5	4
„ „ „ cold storage	...	...	...	...	89	1	8
„ „ „ Packing House							
(including materials sold)	...	...	...	...	1,052	13	8
					£1,604	0	8

Inspection of Limes. During the year 7,632 barrels of green limes packed in Private Packing Houses were inspected.

GOVERNMENT FRUIT FARM, COPT HALL.

The development of the estate has proceeded throughout the year along the lines laid down in the approved scheme, and good progress can be reported. Plots having an approximate area of 27 acres previously cleared and planted have been maintained in good order, drained where necessary and cover crops extended. Plantings during 1932 amounted to 45 acres making a total of 72 acres now cleared and planted. The clearing of land for planting in 1933 was also proceeded with.

A good deal has been done in the way of improving existing roads and establishing windbreaks and fences. In addition one of the principal items of work done was the construction of new paths and roads to facilitate access to and supervision of various plots.

As fresh areas are cleared and brought into cultivation the proportion of the total expenditure necessarily devoted to the cost of maintenance and supervision for such routine work as weeding increases accordingly. Drainage has proved a costly item of expenditure, owing to the large number of boulders encountered and the swampy nature of certain parts of the estate.

Demonstration Plots. These plots are 20 acres in extent, 5 acres being planted on similar lines to the Estate Development Plots, and cultivated as a model holding. The remaining plots are being used for citrus varietal and stock trials. In this section, 834 citrus trees of different varieties have been planted to date, which include the principal commercial varieties of grapefruit and oranges on sour orange, grapefruit and rough lemon stocks. Cover crops have been established over a large part of all these plots. A section of this area is also used for the trial of lime crosses already referred to in this report.

GOVERNMENT FRUIT FARM.

Estate Development Plots. During the year 36½ acres of land were cleared for estate development, bringing the total area cleared for this purpose to 61½ acres, of which 56½ acres are already planted with 2620 citrus trees. The plots vary in extent from 5 to 10 acres and are to be utilised when they reach the bearing stage for a land settlement scheme. The original plan of planting a 5 acre plot as stated in previous reports has had to be slightly modified in order to follow as far as possible the natural boundaries, such as water courses, steep hillsides and existing roads. Some land adjacent to each plot is reserved for and planted in mulch crops, principally lemon grass.

Nursery Work, which gradually decreased during the year, has now been entirely transferred to the nurseries at headquarters.

Expenditure.

Personal Emoluments	...	...	...	...	£314	7	1
Annuity to previous owner	...	...	...	...	75	0	0
Live Stock	...	...	...	...	17	4	8 ⁴
Tools	...	...	...	...	8	12	1
Nursery & Demonstration Plots	...	...	...	...	368	3	1
Estate Development Plots	...	...	...	...	387	0	7
					£1,170	7	2

Receipts.

Revenue derived principally from the sale of fire-wood and catch crops amounted to £33. 15. 2.

RETIREMENT OF F. J. BAPTISTE.

Mr. F. J. BAPTISTE who has been employed by the Agricultural Department for close on 40 years, and held the post of Foreman of the Botanic Gardens for over 30 years retired on pension on the 1st April.

He has been actively engaged in the work of the Botanic Gardens and Experiment Station since their inception, being responsible for the control of labour engaged in their establishment and maintenance. Mr. BAPTISTE is held in high esteem by the general community, as well as by the staff and employees of the Department. The latter presented him with a purse of money and extended their best wishes for the full enjoyment of his hard earned rest after so long and faithful service.

METEOROLOGICAL REGISTER.

METEOROLOGICAL SUMMARY, BOTANIC GARDENS, DOMINICA.

Year. 1932.	THERMOMETER.				Relative Humidity.		Thermometer. Max'm. Min'm.		Barometer Corrected. <i>Reduced to 32° Fh. Sea Level.</i>		Rainfall.		Barometer Corrected. Highest. Lowest.		Thermometer. Highest Maximum. Lowest Minimum.		REMARKS.
	Dry.		Wet.														
	9 a.m.	3 p.m.	9 a.m.	3 p.m.	9 a.m.	3 p.m.	9 a.m.	3 p.m.	Highest.	Lowest.	Highest	Lowest.					
Months.																	
January	...	77	80	73	74	78	72	84	69	30.00	29.91	5.47	30.07	29.82	86	67	
February	...	79	82	75	76	72	67	86	68	30.02	29.94	1.57	30.12	29.85	89	65	
March	...	81	84	74	75	68	62	90	72	29.98	29.90	1.56	30.07	29.80	94	69	
April	...	83	85	71	73	60	62	91	73	29.96	29.89	2.33	30.03	29.81	95	70	
May	...	84	86	77	77	67	64	91	73	30.01	29.91	5.07	30.04	29.80	94	71	
June	...	82	82	76	76	73	71	93	74	29.98	29.94	10.72	30.06	29.90	94	71	
July	...	80	84	77	77	78	70	88	73	29.99	29.94	8.05	30.04	29.89	91	72	
August	...	83	85	77	78	76	70	88	74	29.94	29.89	7.23	30.00	29.85	91	72	
September	...	84	87	78	80	73	69	90	75	29.92	29.85	6.13	29.97	29.78	93	72	
October	...	82	83	78	79	78	80	89	74	29.98	29.84	6.72	29.98	29.75	93	72	
November	...	80	86	76	77	80	75	85	73	29.90	29.82	13.83	29.96	29.74	89	69	
December	...	78	81	73	74	77	67	85	70	29.96	29.88	5.21	30.04	29.82	87	66	
YEAR	...	81	84	75	77	73	69	88	72	29.97	29.89						

Highest Maximum Temperature = 95° on April 25th. Lowest Minimum Temperature = 65° on February 22.
 " Barometer (Corrected) = 30.12, February 5th. " Barometer (Corrected) = 29.74, November 2nd.
 Greatest Rainfall in 24 hours = 4.34, November 18th.

METEOROLOGICAL REGISTER.

RAINFALL AT THE EOTANIC GARDENS, DOMINICA, 1913-1932.

Month	1913.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.	1928.	1929.	1930.	1931.	1932.	Monthly Mean Rainfall.
January ...	7.48	3.22	1.76	10.79	5.00	6.02	2.42	7.54	6.82	6.50	3.82	6.25	7.88	3.68	5.50	6.60	5.18	10.65	1.47	5.47	5.70
February ..	2.32	5.56	1.04	1.90	4.10	8.73	1.52	4.76	1.02	4.30	2.30	1.90	1.95	2.46	4.50	4.25	3.13	2.07	1.05	1.57	3.02
March ...	7.29	2.23	0.84	4.52	6.74	3.32	0.69	3.80	4.46	2.80	3.46	0.66	3.50	.96	5.37	6.30	7.36	3.89	.59	1.56	3.52
April ...	1.57	6.45	15.75	1.22	0.47	1.86	2.36	.22	3.06	2.26	3.77	1.46	.40	2.77	4.67	4.16	1.27	5.01	.51	2.33	3.08
May ...	3.46	2.58	3.65	2.05	2.94	5.90	4.60	2.38	1.54	2.64	0.13	3.18	2.76	2.44	6.69	2.25	2.80	2.21	1.70	5.07	3.05
June ...	3.49	7.27	9.17	4.82	15.34	6.04	3.88	3.48	1.96	7.14	4.18	4.42	5.80	5.76	15.03	6.68	10.87	7.32	9.98	10.72	6.92
July ...	7.57	11.83	14.84	8.23	13.70	11.28	12.64	12.08	11.18	6.08	8.20	13.64	6.25	10.14	9.61	6.58	13.13	7.90	18.45	8.05	10.57
August ...	10.93	3.98	14.74	16.58	8.53	8.46	9.64	8.73	9.30	9.26	11.44	11.28	13.88	10.10	4.65	12.80	12.55	6.76	17.44	7.23	10.42
September.	8.39	7.71	11.36	6.20	15.02	4.14	7.06	8.60	6.28	10.68	4.28	4.88	9.12	4.12	6.20	8.10	5.63	14.66	13.51	6.13	8.10
October ...	10.40	5.13	8.41	10.06	2.46	6.67	7.50	12.60	9.41	2.68	9.84	10.98	12.55	5.86	8.84	4.35	12.19	3.15	9.71	6.72	7.98
November.	4.28	9.44	10.05	14.28	1.92	3.36	9.02	4.62	2.44	3.00	1.03	6.86	9.60	7.54	8.70	7.93	14.39	5.51	11.90	13.83	7.49
December .	2.72	9.70	8.40	3.77	4.58	5.86	6.70	5.62	4.22	6.90	1.92	13.65	2.02	3.75	1.37	5.38	8.48	3.66	7.56	5.21	5.57
Total ...	69.90	75.10	100.01	83.42	80.80	71.46	68.03	74.46	61.72	64.24	54.40	79.16	75.69	59.58	81.13	75.38	96.98	72.79	93.87	73.89	-

Average year = 75.60 inches.

METEOROLOGICAL REGISTER.

RAINFALL RETURNS, DOMINICA, 1932.

STATIONS.	JAN.	FEB.	MARCH.	APRIL.	MAY.	JUNE.	JULY.	AUGUST.	SEPT.	OCTOBER.	NOV.	DEC.	TOTALS.
1. Ba'talie	2.36	.70	.46	.13	1.21	9.56	6.16	2.51	5.46	5.66	10.70	2.00	46.91
2. Botanic Gardens	5.47	1.57	1.56	2.33	5.07	10.72	8.05	7.23	6.13	6.72	13.83	5.21	73.89
3. Canefield	3.75	1.06	1.11	1.45	4.14	12.92	8.43	8.93	5.36	3.76	13.69	2.96	67.56
4. Cabrits	10.35	2.62	3.83	3.60	3.08	10.32	7.23	9.04	7.99	4.77	10.28	5.20	78.31
5. Clark Hall	6.61	7.59	2.09	2.08	2.91	14.64	8.60	10.10	4.09	8.35	19.28	7.05	93.30
6. Governor	13.35	7.14	7.66	7.09	13.22	20.04	15.18	8.37	8.03	13.10	25.64	6.50	145.32
7. Hampstead	9.02	4.19	1.30	4.71	6.40	13.08	12.42	7.22	6.40	11.60	19.31	4.75	100.40
8. Londonderry	2.27	3.50	3.40	2.05	1.34	8.72	8.24	5.64	6.39	8.37	8.75	2.19	60.86
9. Morne Bruce	5.91	1.84	1.74	2.61	5.67	11.58	8.26	8.22	6.77	7.51	13.94	5.62	79.67
10. Picard	12.93	3.56	3.90	2.73	3.51	12.33	9.18	9.58	10.34	5.22	11.17	7.30	91.30
11. Pte. Muliâtre	7.57	3.82	7.87	5.52	10.36	10.79	10.09	12.60	5.55	18.42	24.75	10.27	127.61
12. Rosalie	11.86	5.31	6.41	6.48	9.64	16.41	14.29	10.81	5.18	16.25	33.48	5.95	142.07
13. Shawford	18.72	6.07	5.56	8.76	15.85	28.61	24.84	32.53	7.49	13.32	57.25	16.04	235.04
14. Sherwood	20.75	4.67	7.85	8.44	7.15	19.92	22.31	12.63	8.17	11.51	37.27	8.92	169.59
15. Stowe	8.67	5.58	2.89	7.46	9.90	14.05	8.55	6.76	8.21	16.66	26.04	5.67	120.44
16. Blenheim	9.61	5.82	6.78	8.89	7.10	16.97	13.84	15.09	10.63	22.89	21.27	6.73	145.62
17. Copt Hall	10.05	3.69	3.50	3.81	10.18	18.56	12.36	14.45	7.57	8.10	22.83	8.52	123.62

Mean Rainfall 17 Stations ... 111.85 inches.

8 Leeward Stations...

4 Windward

2 Inland

3 Lasoye

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